

**Response to the Request for Comments Regarding
FCC Commission Document 12-61: “Improving Spectrum Efficiency in the 4.9GHz Band”**
Submitted by: King County, WA

General Statement by King County Transit:

King County strongly supports expanded eligibility for use of the 4.9GHz spectrum to include Critical Infrastructure Industry (CII), particularly for public transportation and local government. 4.9GHz networks have proven to be powerful assets for delivering government services in the Puget Sound Region. Accordingly, we believe a large and diverse community of 4.9GHz wireless users benefits citizens and promotes a healthy, standardized industry to provide and support the technology.

King County has demonstrated the benefit of broad and integrated use of the 4.9GHz band. King County operates a 4.9GHz broadband wireless network on approximately forty-five miles of urban transportation corridors under a FCC license with the sponsorship of the Region 43 Regional Planning Committee. A total of 90-100 miles will be deployed by Fall of 2013.

The King County 4.9GHz network is among the most extensive and sophisticated such networks deployed in the nation, integrating communications for several systems with an architecture supporting eight or more systems across fifty transportation corridors. An estimated 1,500 vehicles and 1,000 fixed devices connected to the wired and wireless network by 2014. The integrated systems include transit security video, signal priority, vehicle location, passenger information, fare payment and on-board system management. The network also includes a wireless LAN dedicated for Public Safety and emergency operations.

Other agencies in the regional are also fielding extensive 4.9GHz networks:

- The City of Seattle is currently deploying a 4.9GHz mesh network in downtown Seattle and along its shoreline in support of shoreline security video and public safety operations. King County has coordinated with the City and its partners and will be entering an agreement to make the two networks interoperable. This will dramatically increase the 4.9GHz wireless coverage area in the region providing multiple interoperable networks for public safety and transportation operations.
- The City Seattle is also deploying a 4.9GHz point/multipoint network connecting approximately 25 city government sites to the City’s internal network and provides voice and data communications to large event command centers.
- The Washington State Department of Transportation (WSDOT) currently has twenty one 4.9GHz licenses throughout the state over several counties. WSDOT has around 100 locations licensed and another 80 locations in various stages of planned, budgeted and installed that are pending licensing. They utilize the 4.9 GHz spectrum for low cost point to point, point to multipoint and mesh applications. These low cost medium capacity links are vital to the state’s transportation system by providing data connectivity to Variable Message signs (VMS), Variable Speed Limit signs (VSL), Remote Weather Information Stations (RWIS), Highway Advisory Radio (HAR) as well as full motion video to the WSDOT 7 Traffic Management Centers (TMC) and Emergency Operations

Centers (EOC). The video and data provided allow the TMC's and EOC's to make real time decision on traffic and road conditions on state and federal highway systems during events and emergencies. In addition the information gathered keeps the traveling public informed of road conditions via VMS, VSL, HAR, local media as well as the internet.

- Pierce and Snohomish Counties have multiple deployments with plans for potential expansion.
- Clark County has one fixed link installation with 3 additional links coming online.
- The City of Pullman, WA will have 5 installations providing communications for fixed camera systems operating by September, 2012.
- They City of Yakima has two 4.9GHz installations, one connecting their water treatment facility and one for video monitoring of a rail underpass construction project.

King County, the City of Seattle and Washington State DOT are demonstrating how the 4.9GHz band can be well utilized through local coordination and interoperability. Expanded access to the 4.9GHz band would promote this level of utilization nationally.

On behalf of the agencies and organizations listed below, King County strongly support expanded eligibility for use of the 4.9GHz spectrum. Please find attached our responses to your specific requests for comment.

Sincerely,

John Toone, ITS Program Manager
King County Metro Transit
King County, WA

This response has been endorsed by the following agencies and organizations:

City of Seattle, WA
Washington State Department of Transportation
Community Transit, Snohomish County, WA
Snohomish County, WA
Pierce County, WA
Clark County, WA
City of Yakima, WA
Region 43 Planning Committee

Responses to selected requests for comment:

43. Expanded usage (Current non-PS entities in partnerships please comment)

43a. [Q] Would expanded use improve commercial viability and availability of equipment for the 4.9ghz band?

Yes. There are currently only a small number of vendors offering 4.9GHz equipment. One of the largest, Cisco, recently discontinued its 4.9GHz WAP and has not announced a replacement model. The subcomponents are common with other bands, but the relatively small number of potential customers appears to be insufficient to draw in vendors. Expanded use is likely to expand the demand for equipment.

43b. [Q] Should non-PS users under expanded eligibility be subject to a shutdown feature?

A shutdown feature is unnecessary and counter-productive to wider adoption. Instead of a shutdown feature for non public safety networks, interoperability should be the goal so that public safety applications can take advantage of operating networks instead of having to duplicate their coverage. The same goal of giving emergency operating priority to bandwidth can be just as effectively achieved through level of service (LoS) and quality of service (QoS).

43c. [Q] Should this be implemented using dynamic access control?

(need input on this item)

43d. [Q] Should CII be allowed to use 4.9ghz without a sharing agreement?

Critical Infrastructure, particularly transportation and local government, should be allowed to use the 4.9GHz band without a sharing agreement. This would support two major goals:

A larger user base of users to support more 4.9GHz products, support, innovation and competition.

A wider deployment of 4.9GHz networks that, through interoperability, provide a wide coverage for both public safety and CII wireless communications.

43e. [Q] How would including CII affect the coordination schemes?

Regional coordination should not be significantly affected outside the addition participating entities.

43f. [Q] Should 4.9ghz be extended to non-PS government entities?

Extension to non public safety government agencies should be a priority over non government entities.

43g. [Q] What relevance is the Spectrum act expanded definitions?

43h. [Q] What other benefits might arise through expanded eligibility?

In addition to a larger user base and wider deployment of interoperable networks, expanded eligibility should stimulate innovation and standardization. Additionally, extending eligibility to other government service involves multiple strategic interest areas increasing the potential sources of funding. A significant opportunity for collaboration exists between public safety and transportation. Both fields are seeking to deploy nationwide communication systems: FirstNet and Connected Vehicles. The Connected Vehicles initiative will use the 5.9GHz band for vehicle-to-vehicle and vehicle-to-infrastructure communications for safety and mobility applications. This network will include private autos connecting anonymously as well as public transit vehicles.

However, Intelligent Transportation Systems (ITS) supporting public transit and mobility require a more defined and controlled network architecture that is well addressed using the 4.9GHz band as we are doing in King County. The common basic equipment and the shared footprint create an opportunity for sharing capital and operating costs between public safety and transit, and more efficiently using the 4.9GHz band to benefit the public. For a further discussion of the similarity between 4.9GHz and 5.9GHz protocols, and an explanation of the King County Transit ITS network using 4.9GHz, please read our paper presented at the ITS World conference: [Connected Vehicles using 4.9GHz](#).

43i. [Q] What are the costs of expanded eligibility including congestion?

45. Single jurisdictional licensing.

45a. [Q] Would single licenses help utilize the spectrum more efficiently and encourage coordination?

Yes.

45b. [Q] Would reducing the number of licenses simplify regional coordination?

Yes.

45c. [Q] If adopted, should PS and non-PS in the same agency share a single license?

Yes

45d. [Q] What other benefits?

45e. [Q] What would be the time and cost of internal coordination?

This coordination needs to be done today, so there would not be any additional cost.

45f. [Q] How would requirements be enforced within an agency with multiple users?

These adds/changes should be brought back to the RPC so coordination is on a larger scale to include the agency's neighbors. It should be up to the licensee POC (or designee) to take these matters to the RPC.

48. Fixed uses

48a. [Q] What other uses in addition to video could use dual 700/4.9 dual band access.

Public transportation telemetry data.

48b. [Q] What situations are best suited to fixed 4.9ghz?

Vehicle to Infrastructure (V2I) and 'last mile' infrastructure communications.

48c. [Q] How can fixed links be used in day-to-day or emergency operations?

This band, and the equipment available, lends itself very well to "last mile" for multiple voice/data operations and is invaluable for emergencies to set up the necessary voice and data connections to a large impact incident command post. The events include fires, shootings, vehicle crashes, landslide responses, flooding, etc. Anytime we need to have a large response and thus need immediate voice and data access.

48d. [Q] What rule changes are needed for 4.9ghz fixed use?

53. Channel aggregations: 5, 10, 15 20

53a. [Q] What other aggregations should be allowed? Greater than 20 necessary?

Other aggregations are not necessary.

53b. [Q] Are there any inefficiencies in current plan?

No.

53c. [Q] Should there be different base widths other than 1 and 5?

No.

53d. [Q] What are the costs to adjust?

54. Narrow channels

54a. [Q] Would reserving the 1mhz channels for narrowband impact broadband?

No.

54b. [Q] Are 10 1mhz channels sufficient or excessive for narrowband?

55. Usage specific channels

55a. [Q] Should p2p narrowband license applicants be required to demonstrate there are no alternatives?

55b. [Q] Should there be a minimum p2p distance requirement?

55c. [Q] Should channel use be coordinated locally? How?

The regional planning committees that manage 700 MHz and 800 MHz coordination and have already, in some cases, incorporated 4.9 GHz coordination, have well-established forums and processes.

64. Why standards haven't been mandated to date.

64a. [Q] Does interoperability require standardization?

Yes.

65. Competitive marketplace

65a. [Q] How should the FCC ensure a competitive marketplace for 4.9ghz?

Expanded eligibility and adoption of commercially available standards.

65b. [Q] How should FCC involve existing equipment?

65c. [Q] Multiple or single standard across uses?

A single license per agency promotes strong internal coordination of the 4.9GHz network architecture within large agencies and simplifies coordination with external stakeholders.

65d. [Q] Are most low power users going to an existing standard such as 802.11?

Yes.

65e. [Q] Is there a defacto standard for high-power?

65f. [Q] Is interconnection two 4.9ghz networks currently possible? If not, what would make this possible?

It is currently possible, but would be improved through a requirement for the use of commercial standards in wireless LAN control, routing and authentication.

65g. [Q] What would be the cost to equipment manufacturers of standardization requirements?

If the standardization matched commercial standards the cost would be negligible.

65h. [Q] How would these costs affect licensees over time?

No impact.

65i. [Q] Does the 802.11 offer economies of scale?

Very much. Point/multipoint 4.9GHz and 5.9GHz DSRC are both based on the 802.11a standard.

65j. [Q] Would standards benefit PS by promoting interoperability?

Yes.

66. Importable technology

66a. [Q] What is the potential to adapt similar equipment in neighboring bands to 4.9ghz?

There is great potential for technology collaboration between 4.9GHz equipment and equipment for neighboring bands; In particular, 5.9GHz DSRC. The significant difference between the two is frequency. See [paper] for a discussion of the similarities.

66b. [Q] Is 4.8 adaptable to 4.9?

66c. [Q] Vice-versa?

66d. [Q] If so, how and what cost?

67. Emission masks related to

67a. [Q] Are the current mask requirements of DSRC-A for low power and DSRC-C for high power leveraging COTS equipment availability?